A capacitive touch screen according to a first embodiment of the present invention includes a substrate, a first electrode plate, an elastic spacer, a second electrode plate and a transparent panel.

The substrate comprises a plate which is open in a central portion thereof other than a rim or comprises a transparent solid plate.

The first electrode plate is placed on the upper surface of the rim of the substrate.

The elastic spacer is placed on the upper surface of the first electrode plate and is variable in thickness in response to application of an external pressure so as to be restorable to its original shape.

The second electrode plate is placed on the upper surface of the elastic spacer.

The transparent panel is placed on the upper surface of the second electrode plate to cover the entire area of the substrate.

A capacitive touch screen according to a second embodiment of the present invention includes a substrate, a first electrode plate, an elastic spacer, a second electrode plate and a transparent panel.

The substrate comprises a plate which is open in a central portion thereof other than a rim or comprises a transparent solid plate.

The first electrode plate is placed on the upper surface of the rim of the substrate.

The elastic spacer is placed on the upper surface of the rim of the substrate and is variable in thickness in response to application of an external pressure so as to be restorable to its original shape.

The transparent panel is placed on the upper surface of the elastic spacer to cover the entire area of the substrate.

The second electrode plate is placed beneath the lower surface of the transparent panel such that the second electrode plate is spaced apart from the first electrode plate by a predetermined distance.

A capacitive touch screen according to a third embodiment of the present invention includes a substrate, a first electrode plate, first and second elastic spacers, a pair of second electrode plates and a transparent panel.

The substrate comprises a plate which is open in a central portion thereof other than a rim or comprises a transparent solid plate.

The first elastic spacer is placed on the upper surface of the rim of the substrate and is variable in thickness in response to application of an external pressure so as to be restorable to its original shape.

The first electrode plate is placed on the upper surface of the first elastic spacer.

The second elastic spacer is placed on the upper surface of the first electrode plate and is variable in thickness in response to application of external pressure so as to be restorable to its original shape.

The transparent panel is placed on the upper surface of the second elastic spacer to cover the entire area of the substrate.

The second electrode plates are respectively placed on the upper surface of the rim of the substrate and beneath the perimeter of the lower surface of the transparent panel such that the second electrode plates are spaced apart from the first electrode plate by predetermined distances.

In the first through third embodiments, at least one of the first electrode plate and the second electrode plate comprises four or more electrode plates which are arranged along the rim of the substrate at positions spaced apart from each other at predetermined intervals.

Preferably, one electrode plate of the first electrode plate and the second electrode plate comprises four or more electrode plates arranged along the rim of the substrate at positions spaced apart from each other at predetermined intervals, and the other electrode plate comprises a single electrode plate arranged over the rim along the overall length thereof.

When a contact pressure is applied to a portion of the transparent panel, a distance between the first electrode plate and the second electrode plate is restorably varied by elastic height variation of the elastic spacer or the first and second elastic spacers, so that capacitances are varied at sensing points corresponding to locations of the four or more electrode plates, and a touch location and a touch pressure are determined by variation rates of the capacitances measured at the sensing points.

Preferably, the elastic spacer comprises an elastic synthetic resin member or a spring which varies in height in response to application of an external pressure so as to be restorable, or a hinge structure having restorability to be returned to an original state thereof.

Advantageous Effects

The capacitive touch screen according to the present invention can detect not only a touch location but also the intensity of touch pressure when a substance comes into contact with it even though the substance is a nonconductor, rather than detecting only a basic touch location in such a way as to check variation in parasitic capacitance only when contact is made therewith by a conductive substance. Therefore, various input signals which have not been implemented in the conventional touch screen can be created using the touch location and the intensity of touch pressure.

Furthermore, in the capacitive touch screen of the present invention, the substrate has a structure which is open in the central portion thereof or is made of a transparent solid plate. In addition, first and second electrode plates and elastic spacers are arranged only on a rim or perimeter of the substrate, and a transparent panel is placed on them. Hence, the high visibility of images displayed on a display provided under the touch screen is ensured. As well, the capacitive touch screen of the present invention has a simple structure, thus reducing the production cost.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is an exploded perspective view of a touch screen, according to a first embodiment of the present invention;

FIG. **2** is a schematic plan view of FIG. **1**;

FIG. **3**A is an exploded perspective view of a touch screen, according to a first embodiment of the present invention;

FIG. **3**B is an exploded perspective view of a touch screen, according to a first embodiment of the present invention;

FIG. **3**C is an exploded perspective view of a touch screen, according to a first embodiment of the present invention;

FIG. **3**D is an exploded perspective view of a touch screen, according to a first embodiment of the present invention;

FIG. **4** is a schematic partial sectional view of FIG. **1**;

FIG. **5** is a schematic partial sectional view of a touch screen, according to a second embodiment of the present invention;

FIG. **6** is a schematic partial sectional view of a touch screen, according to a third embodiment of the present invention;

FIG. **7** is of schematic partial sectional views showing examples of an elastic spacer of a touch screen, according to another embodiment of the present invention; and